

REMARKS

Status of the Claims

Claims 1-34 and 36-54 are currently pending. Claim 54 is new. All cancelled subject matter was cancelled without prejudice to its assertion in a continuing application.

In the claims, there were two claims numbered "38," and as a result, some of the claims had to be renumbered. To more clearly illustrate the changes in the claim numbering, the Applicants provide this table (below), which shows the original claim number and the new claim number. As can be seen, the numbers of the first 38 claims did not change. The second occurrence of claim 38 was changed to 39, and all other claims were renumbered accordingly.

Applicants also note that they changed the dependencies of some claims, in order to reflect the new claim numbers and minor typographical errors were also corrected, e.g., "polymerisation" was changed to "polymerization."

Support for new claim 54 can be found in claim 29.

No new matter has been added.

Original Claim No.	New Claim No.
1	1
2	2
3	3
4	4
5	5

Original Claim No.	New Claim No.
28	28
29	29
30	30
31	31
32	32

6	6
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15
16	16
17	17
18	18
19	19
20	20
21	21
22	22
23	23
24	24
25	25
26	26
27	27

33	33
34	34
35	35
36	36
37	37
38 (first occurrence)	38
38 (second occurrence)	39
39	40
40	41
41	42
42	43
43	44
44	45
45	46
46	47
47	48
48	49
49	50
50	51
51	52
52	53

Claim Objections

Applicants thank the Examiner for identifying informalities in the claims and for providing suggestions for correcting the informalities. In response, Applicants note the following. Claim 1 has been amended as the Examiner suggested. The first amendment to claim 29 suggested by the Examiner has been made. The second part of claim 29 was cancelled and put into new claim 54. In light of these amendments, withdrawal of the claim objections is respectfully requested.

Rejections Based on 35 U.S.C. §112, Second Paragraph

Claims 28 and 50-52 (now renumbered as claims 51-53) stand rejected as allegedly being indefinite and for not identifying any steps. Applicants note that these rejections are moot in light of the claim amendments made above. Consequently, reconsideration and withdrawal of these rejections is requested.

Rejections Based on 35 U.S.C. §101

Claims 50-52 (now renumbered as claims 51-53) stand rejected as being "use" claims. Applicants note that this rejection is moot in light of the claim amendments identified above. Consequently, reconsideration and withdrawal of this rejection is requested.

Rejections Based on 35 U.S.C. §102(e)

Claims 1, 3-15, 17-25, 33-34, and 36-52 (original claim numbers), stand rejected under 35 U.S.C. §102(e) as being anticipated by Yang et al., (U.S. 6,800,580 B1). Applicants respectfully disagree.

Yang is directed towards a method for producing a catalyst for homo- and co-polymerization of olefins. In the method of Yang, first a magnesium compound solution is produced from a mixture of a non-reducible magnesium compound and a compound of an element of Group IIIA of the Periodic Table (cf. column 2, lines 61-64; step (i) of claim 1). Then, said magnesium solution is reacted with a transition metal compound to precipitate solid particles (cf. column 2, lines 64-67 or column 5, lines 23-29 “*to obtain precipitate of solid particles*”; step (ii) of claim 1). Finally, the precipitated particles are treated with a titanium compound in the presence of an electron donor to obtain the final catalyst (cf. column 2, line 67 to column 3, line 3 or column 6, lines 9-17: “[*the*] solids are reacted with a titanium compound in the presence of a proper electron donor [...] to obtain the intended catalyst”; step (iii) of claim 1). Summarizing the above, first a magnesium compound solution is formed, then a non-active solid carrier is produced and finally the active catalyst is prepared by adsorbing titanium and an electron donor on the carrier.

In Contrast, in the present invention, a solid carrier is not formed and a precipitation reaction does not occur. Instead, an emulsion is formed from a solution of a Group 2 metal and an electron donor and the addition of a transition metal (and an aluminium alkyl compound). The dispersed phase of the emulsion already contain all of the catalytically active ingredients. The liquid droplets of the dispersed phase are then solidified by heating the system, i.e. no precipitation reaction takes place, rather a solidification reaction that starts from within the droplets occurs. The morphology of the liquid dispersed droplets, such as the spherical shape and uniformity of the droplets is

preserved during the solidification process (see page 10, line 27 – to page 11, line 3). (Uniformity of the particle means that the chemical components are evenly distributed through the whole particle, i.e. the catalytically active sites are distributed throughout the whole particle and are not located on the outer surface of the particles only). The produced catalysts according to the invention have excellent morphology, good particle size distribution and activity maximum at higher temperature.

Thus, the process of the present invention differs significantly from the process of Yang, as Yang does not use the emulsion solidification technique of the present invention but describes the preparation of a solid carrier material, wherein the catalytically active components are only adsorbed on the surface of the carrier material. Consequently, Yang does not anticipate the currently pending claims. Thus, reconsideration and withdrawal of this rejection is therefore respectfully requested.

Rejections Based on 35 U.S.C. §102(b)

Claims 1-15, 17-34, and 36-52 stand rejected as allegedly being anticipated by Cuffiani et al. (EP 0 083 073 A1). Applicants respectfully disagree.

Cuffiani describes a method for the preparation of catalyst components. First a mixture of a magnesium halide, an aluminium halide and a titanium halide is prepared in toluene and in the presence of a halogenated hydrocarbon. As a result an oily liquid is obtained (cf. page 7, lines 6-15). Said liquid is immiscible in the common aliphatic hydrocarbons. This oily liquid is emulsified then in an oil of paraffinic, naphthenic, aromatic or siliconic type (cf. page 10, lines 10-19). This emulsion is then subjected to transformation reactions, which involve the formation of a solid phase comprising a Ti compound supported on a magnesium halide, i.e. emulsions are made to react with reagents capable of transforming the adduct in active catalytic component. (cf. page 5,

lines 17 - 21, page 6 and page 9, lines 24-27).

On page 10, l. 20-23, it is further said that it is possible (in some cases) to prepolymerize small amounts of olefins in order to stabilize the emulsion, if needed. The prepolymer thus obtained has to be treated with an ether solution in order to obtain the active catalytic component. However, in case some prepolymerization has been done, the emulsion is first reacted with some Al compound and the obtained suspension is then conducted to some prepolymerization.

In the examples of Cuffiani, the following procedure is described:

- 1) first an emulsifiable liquid A is formed from Mg and Al halides;
- 2) then an emulsion containing liquid A, into which $TiCl_4$ had been added, was formed in silicon oil;
- 3) the emulsion from step 2 was reacted with TEA (triethylaluminium) and a suspension was formed. This means that the emulsion was transformed to suspension. (emulsion = liquid in liquid, suspension = solid in liquid). I.e. due to the addition of TEA, a precipitate was formed, which was kept as suspension. This suspension is then subjected to some prepolymerization step.

Thus, the difference between the currently pending claims and Cuffiani is that in Cuffiani, when preparing the emulsion, an inert, immiscible liquid is used as the continuous phase, whereas in the currently pending claims, the continuous phase is not immiscible. I.e. in the second step, the compound of a transition metal is reacted with the solution prepared in step (a) to produce an emulsion, wherein it is known to a person skilled in the art that an emulsion is a liquid suspended in another liquid, i.e. it consists of

a disperse and a dispersed phase. The emulsion of the currently pending claims is characterized by the fact that more than 50 mol% of the Group 2 metal complex is present in the dispersed phase. This means, both phases of the emulsion consist of the same components, only their concentrations in the two phases are different. Consequently, no additional immiscible solvent is used but the emulsion is formed from the solution of step (a) and the (liquid) transition metal added in step (b). In the emulsion, a dynamic equilibrium exists, which allows for an exchange of compounds between the two phases. In addition, essentially all compounds (or their precursors) that can be found in the final, solidified, catalytic spheres are already present in the dispersed phase during formation of the emulsion. All reactions that are relevant to the composition of the emulsion (and consequently the solid catalyst) are taking place in solution.

Further, the aluminum compound is added to this liquid/liquid system to prepare the final catalyst in liquid form and thus is not used for any precipitation reaction.

In Cuffiani, the transformation from liquid phase to solid phase (as suspension) is effected by a chemical reaction (so called “transformation reactions”) by using e.g. an Al compound. In addition some prepolymerization can be used in order to stabilize the system. In the present invention no such solidification by using chemical reaction is used. Instead the solidification is achieved by heating.

Thus, in the currently pending claims, the essential feature is the addition of an Al alkyl compound into the system before recovering the solidified particles, which results in better activity at higher polymerisation temperatures. The Al compound does not cause precipitation or solidification of the droplets. Evidence of this may be seen in the following: adding the Al compound during the formation of the emulsion will not cause any solidification (which is started by heating the system in step d)). On the other hand, if said Al compound is added between steps d) and e) (i.e. after solidification, but before

final recovery), it is clear that it is not Al compound that causes the solidification to happen.

Thus, the process of the present invention is differs significantly from the process of Cuffiani, as Cuffiani does not use the emulsion solidification technique as encompassed by the instant claims, but rather, describes the use of an Al compound for precipitation of a solid material. Thus, the methods are different. In light of the above, reconsideration and withdrawal of the rejection based on 35 U.S.C. §102(b) is respectfully requested.

CONCLUSION

Applicants respectfully submit that all requirements of patentability have been met. Allowance of the claims and passage of the case to issue are therefore respectfully solicited.

Should the Examiner believe a discussion of this matter would be helpful, he is invited to telephone the undersigned at (312) 913-2114.

Respectfully submitted,

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